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ABSTRACT

This manual, intended primarily for use by preservation supervisors, includes a discussion of basic leather preservation techniques, and a description of the entire leather book preservation program at Olin Library, Cornell University. Discussions of work flow, materials, treatment steps, scheduling, and recruiting student assistants are included. Basic procedures which include selection, dusting, salting, and oiling are also discussed. A selected bibliography on leather binding preservation is appended.
(MBR)

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THE PRESERVATION OF LEATHER BINDINGS: BACKGROUND,
ORGANIZATION OF A PROJECT, AND PROCEDURES

Meredith Brown

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CONTENTS

I. INTRODUCTION	
A. The arguments for beginning a leather treatment project.	7
B. Nature and function of the leather treatment processes.	8
1. Protection against acid-catalyzed oxidation.	
2. Lubrication.	
II. ORGANIZATION OF A LEATHER TREATMENT PROJECT.	
A. Work space.	12
B. Materials and tools.	13
C. Organizing the work-flow.	15
1. Steps in the treatment process.	
2. Batching.	
3. Dividing the work between student assistants and a supervisor.	
4. Scheduling student assistants.	
5. Using a log book.	
6. Estimating the probable output of a project.	
D. Training student assistants.	20
1. Recruitment.	
2. Initial training session.	
3. Individual sessions.	
4. Using this manual.	
5. Student questionnaire.	
6. A final note about craftsmanship.	
III. BASIC PROCEDURES.	
A. Selecting books to be treated.	24
1. Styles of binding.	
2. Bindings which should not be treated.	
3. Rare books.	
4. Mending problems.	
5. Care in handling books.	
6. Recording.	
7. Notes to other workers.	
8. Books currently circulating.	
B. Dusting.	28
C. Salting.	29
1. Getting ready to work.	
2. Wet hand/dry hand technique.	
3. Staying back from edges that meet cloth or paper.	
4. Areas which require special care.	

Salting (cont'd.)

5. Knowing where you are.
6. How much salt to apply.
7. Special problems.
8. The drying set-up.
9. Cleaning-up.
10. Record-keeping.

D. Oiling. 36

1. Additions to instructions in salting section which are also relevant to oiling.
2. How much oil to apply.
3. Caution with details.

E. Preparing a batch for reshelving. 41

1. Checking absorption of the oil and rubbing books dry.
2. Checking the work.
3. Recording the treatment in the book.

APPENDIX: Summary sheets for dusting, salting and oiling.

SELECTED BIBLIOGRAPHY.

Preface

This manual was developed by Meredith Brown in conjunction with the leather preservation project in the Circulation Department of Olin Library. It was written over a two-year period and has been subject to continuous revision upon experience gained throughout that time. We are now making the manual available to others in the hope that it can be used with minor modifications as a basis for similar programs.

In addition to descriptions of the basic leather preservation techniques, the manual provides a description of our entire program of leather book preservation--how it is organized, how books are selected for treatment, the training of students, etc. Although the manual is primarily intended for the use of preservation supervisors, parts of the text may be used as instruction sheets for students or other employees who are being trained to do the work. The participation of student employees--made possible by efficiencies in our work arrangements in the first half of each semester--has been crucial to the implementation and success of the Olin Library project.

The major published sources to which the manual is indebted are mentioned in the bibliography. The entire project owes a special debt to Donald Eddy, Rare Book Librarian at Cornell, as our initial effort was based almost entirely on the procedures followed in his department. Also the members of the Cornell Preservation Committee, especially its chairman Richard Strassberg, have frequently provided useful advice and criticism. In its final draft, the manual benefited greatly from a detailed critique by Dr. Robert McComb and Linda McWilliams of the Library of Congress' Preservation Office. But the responsibility for the accuracy of the manual clearly remains our own.

In making this manual available we not only hope that it will be found useful and encouraging to other libraries considering similar programs, but look forward to learning from their experience by any comments or suggestions for improvements which they may have.

Robert S. Moore
Circulation Librarian
John M. Olin Library
Cornell University
June, 1978

I would like to express my own thanks to the people Bob Moore mentions in his preface, for their generous contributions of time and energy; and I would like to thank also

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Jane Lytle, for some help with the final revision and extraordinary care in the preparation of the manuscript;

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Meredith Brown

INTRODUCTION

Professional book conservators recommend two types of preservation treatment for most leather-bound books: protection from the effects of acid in the leather, and lubrication to replace the oils lost through aging and wear. These treatments can be seen as the necessary price for leather's many advantages as a binding material--its beauty, its sturdiness, and its ability to respond to relatively simple preservation techniques.

The Cornell University Libraries contain thousands of leather-bound books. Many of these are given special treatment because they are valuable enough to be in Rare Books or other special collections. This manual is most concerned, however, with treatment for the leather-bound books in the general collections--those which are not extremely valuable, but often very beautiful, at the least serviceable. Even the cheapest and simplest of these bindings are more attractive and sturdier than the bindings with which they are likely to be replaced. In fact many of our leather-bound books are already so badly deteriorated that treatment can't help them; eventually they will have to be rebound or discarded.¹ But many others can be given treatment which will extend their lifetimes considerably.

A leather treatment project can be launched in a relatively small space; it can be carried forward gradually; and much of the work can be done by trained student assistants. In particular, as Part II describes, a project can be organized to use marginal student time--time in which students must be scheduled against the possibility of heavy work, but can be spared if the work is light.

Proper storage conditions - temperature, light, humidity, etc. - and careful handling procedures are also crucial to the preservation of leather-bound books (and all books). Although this manual includes some aspects of proper handling in the descriptions of basic procedures, we have not tried to cover either storage or handling in detail. Several of the sources listed in the bibliography have excellent sections on these topics.

¹ In one semester's work in the pilot project at Olin Library, for example, approximately 2900 leather-bound volumes were considered for treatment, and of these 30 per cent were found to be too badly deteriorated to benefit from the treatment. In some specific subject areas the proportion of untreatable volumes is as high as one half.

NATURE AND FUNCTION OF THE LEATHER TREATMENT PROCESSES

NOTE: Some leathers should not be given either of the treatments described below. These are vellum, alum-tawed leathers (chiefly pigskin), and suede. These exceptions are covered in greater detail in the section on Selecting books to be treated, in Part III (pp. 24-27).

Protection against acid-catalyzed oxidation

In addition to the acid which is sometimes left in leather when it is manufactured, nearly all leather bindings contain acid which has been produced within the leather fibers. The following is a rough summary of how this happens:

Acidic gases, principally sulphur dioxide, are produced by the burning of sulphur-containing materials such as coal and gas, and are present in the atmosphere.

Leather absorbs these gases and the sulphur dioxide reacts with oxygen to form sulphur trioxide, which then combines with the moisture present in leather to form sulphuric acid.

As this acid accumulates it hydrolizes and catalyzes oxidation of the leather, eventually ending in a condition known as "red rot." The leather becomes powdery or dusty and very weak, and patches may be entirely eaten away.

Vegetable-tanned leather contains protective salts which block this chemical process. Unfortunately in the nineteenth century leather manufacturers introduced various "improved" techniques which had as a side effect the removal of the protective salts. Nobody had been aware of the protective relationship which was thus disrupted, and the consequences of the disruption were not immediately obvious. In his book The Preservation of Leather Bookbindings (see bibliography), H. J. Plenderleith describes particular sets in the British Museum in which early volumes although worn were basically sound, while later volumes were already disintegrating.

Eventually, as Plenderleith describes, a chemist working for the British Leather Manufacturers' Research Association, R. Faraday Innes, established these two basic principles: all leathers experience acid build-up if they are exposed to air containing acidic gases; and only those leathers which contain protective salts are able to resist the long-term effects of the accumulating acid.

Fortunately there is a remedy. A salt solution applied to the surface of a leather binding can effectively protect it against future activity by the acid already present and that which continues to form. This is a

preventive measure, however, not a cure--the salt can't reverse any acid damage which has already occurred.

The salt solution currently recommended by professional conservators contains potassium lactate, one of the salts found naturally in leather, with a very small percentage of paranitrophenol to inhibit mold.

An older leather which still contains the protective salts from its original tanning will not be harmed by the addition of salt from the treatment. Thus there is no need to try to determine which leathers contain salts and which don't - which is good, because there is no practical way of knowing. It should be pointed out, however, that some leathers may be discolored by the treatment, in some cases permanently; and a leather which is already badly deteriorated may harden and darken when the solution is applied (in reaction to the water in the solution, actually, rather than the salt.) For this and a number of other reasons, the books to be treated must be selected with considerable care. This is discussed in greater detail in a later section (pp. 24-28).

According to the leather treatment specialists at the Library of Congress, a highly polluted atmosphere could eventually "use up" the potassium lactate, cancelling its protective effect. Thus it may theoretically be necessary to repeat the treatment. Since the optimal interval between treatments is not yet known, however, and since the Cornell collections in Ithaca are exposed to relatively clean air, it is probably reasonable to plan on just one treatment in the foreseeable future. Any book which is washed or exposed to heavy moisture should be retreated, since the salts will have been leached out.

Lubrication

The need for lubrication is described as follows in a leaflet by Paul Banks, book conservator at the Newberry Library in Chicago:

Leather consists of bundles of fibres. Its suppleness is due to the fact that the fibre bundles slide over one another. However, to do this, the fibres must be lubricated, just like machinery. All leather is "plumped" with oils and fats at the tannery, but these organic substances oxidize or otherwise disappear in time. Thus leather needs to have its oils replenished from time to time.

Unlubricated leather becomes dry, brittle and extremely vulnerable to damage, especially in the areas most exposed to wear and tear. How much this shows depends to some extent on how much the book is used. A binding may sit on the shelf for years, not showing any particular deterioration except a dull surface--and then the cover may snap off

the first time it's opened.

Obviously the oiling treatment can't rejoin any portions of the leather which have already parted. For a binding which is basically whole, however, the treatment often makes an impressive difference, restoring much of the leather's original strength and beauty.

The dressing which has been adopted for use at Cornell contains 60 per cent neatsfoot oil and 40 per cent anhydrous lanolin (by weight).² The treatment consists of applying the oil to the surface of the leather and then allowing time for it to sink in and be absorbed by the fibers.

The oiling treatment should be redone at intervals. How soon it needs to be redone depends largely on environmental conditions; the Library of Congress recommends three to five years. Obviously in a large collection this may not be possible, but it is something to aim at for the more valuable volumes.

2

The Library of Congress also recommends a slightly different formula in which the proportions are reversed, i. e. 60 per cent lanolin and 40 per cent oil. They report that this may give better control in application (although the formula given above works quite well with the application techniques described in this manual), and that it may last longer, since the lanolin is less volatile than neatsfoot oil.

ORGANIZATION
of a
LEATHER TREATMENT PROJECT

A leather treatment project can be organized in many ways, depending on the number of people involved, the hours each of them can give, the work space, and the number of books needing treatment. For example, the pilot project at Olin Library has enlisted five to eight student assistants each semester, each one working only a few hours a week on the project, with a part time supervisor, a small work space, and the knowledge that there are thousands of books waiting for us. Most of the suggestions here are appropriate not only to this sort of situation, however, but also to a project organized differently, for example one in which one person works independently two or three hours a day.

WORK SPACE

The work space should include a work surface, drying shelves, and a storage area.

1. Work surface. The work surface need not be large--about two feet square will do--and doesn't have to be permanently reserved for the leather preservation project so long as it can be available when needed. The work surface should be near a sink if possible.

2. Drying shelves. Use ordinary book shelves with book ends spaced to make slots. Unprinted newsprint should be spread on the shelves under the book ends to absorb excess salt solution or oil. (See Fig. 1, below.) A large book truck can be used as drying shelves for a limited number of books, if book shelves on the wall aren't available and cannot be installed.

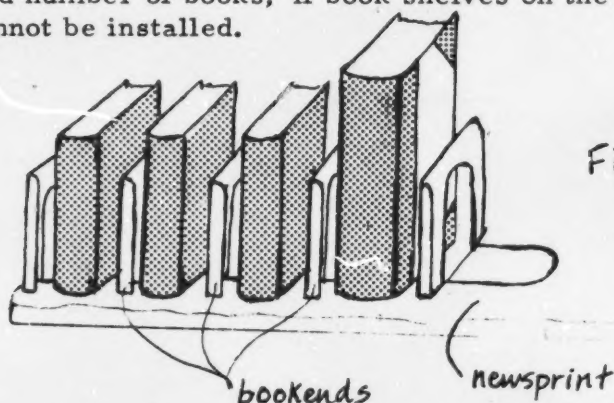


Fig. 1 Books on drying shelf

You can use the same drying shelves for books that have been salted and books that have been oiled. To avoid confusion the books are placed on the shelf differently after the two different steps: books that have been salted are placed on the drying shelves with their spines facing away from the work area; and books that have been oiled are placed with their spines facing towards the work area.

3. Storage. You need some sort of storage, a locker or a shelf in a supply cabinet, for tools and supplies. A standard 10" x 11 1/2" locker can easily hold everything but the newsprint.

Ideally the work area should be out of traffic. At Olin, where a working preservationist directly blocks traffic to the coat closets, snarls and spills have been somewhat reduced by a removeable warning sign advising oncoming pedestrians that there are "preservationists slaving away just around the bend."

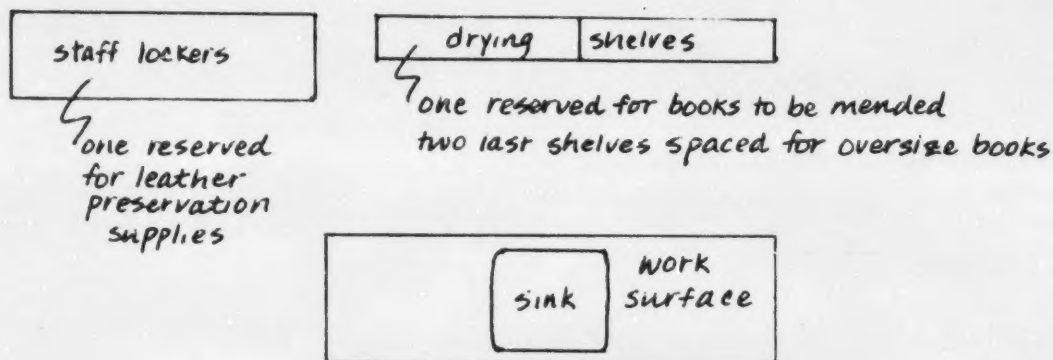


Fig. 2 Diagram of a sample
leather preservation work area
(at Olin Library)

MATERIALS AND TOOLS

Cornell libraries may obtain all of the following (except the recycled routing slips) through the regular supply channels. (To avoid confusion include the words "leather preservation" in the request--for example "leather preservation oil.")

Salt solution. The salt solution recommended is a 7 per cent dilution of potassium lactate with 1/4 per cent paranitrophenol added as a preservative, obtained through TALAS in New York City. A note about worker safety: this solution can stain fingers or clothes, and the paranitrophenol is classified as a toxic chemical, so it's important to be careful. A glove should always be worn when salting.

Oil. We use a mixture of anhydrous lanolin (40 per cent) and neatsfoot oil (60 per cent) (percentages by weight). The oil is as good for skin as it is for leather--there's no need to protect your hands from it.

Sponges. For applying the salt and oil. Small, easy-to-handle sponges (about 1 1/2" x 2") can be cut from a finely textured kitchen sponge. You should have separate sponges for salting and for oiling, color coded to avoid confusion. Even when washed thoroughly after each use the

sponges have a limited life-span and must be replaced regularly.

Unprinted newsprint. For covering the drying shelves and the work surface.

Gloves. For use when salting. The easiest to use are the lightweight disposable plastic gloves that come in rolls.

Lab apron. For protecting clothes from dust, salt, oil.

Cheesecloth. For use as dust cloths and as polishing cloths. (Separate cloths should be used for these two functions.) (Note: a vacuum cleaner may be used for dusting, if one is available. If a vacuum cleaner is to be used, consult Carolyn Horton, Cleaning and Preserving Bindings and Related Materials, p. 5 (see bibliography). She recommends certain adaptations to the equipment.)

Recycled routing slips. For leaving notes in the books and on the shelves.

Log notebook. For recording the work and for notes among people working on the project.

ORGANIZING THE WORK-FLOW

Steps in the treatment process

1. Selecting books to be treated; eliminating leathers which should not be treated, fakes, volumes too badly deteriorated, etc.; spotting possible candidates for transfer to Rare Books.
2. Dusting.
3. Mending, for those books which need it. (Books needing internal repairs--i. e. tipping in pages, etc.--should be salted and oiled first, so they're lubricated before being stressed in the course of the repair.)
4. a. Applying the salt solution. This is done first, before the oiling, so that the salt solution can penetrate the leather.
b. Drying time for the salt solution. (About one hour.)
5. a. Applying the oil.
b. Drying time for the oil. (About twenty-four hours.)
6. Checking the work; polishing; making a note in each book to indicate that the treatment has been done.
7. Reshelving.

Detailed descriptions of each of these steps are provided in section III of this manual.

A note about cleaning- The potassium lactate solution will remove some dust and grime. More extensive cleaning may be attempted using Propert's Saddle Soap with water or potassium lactate. (See either Carolyn Horton, p. 48, or Bernard Middleton, pp. 66-67, for details.) If you do decide to clean books with saddle soap, this should be done before the potassium lactate is applied. You must be extremely careful to remove all traces of soap, and to avoid soaking the leather and boards beneath with the liquid. You can clean all the books, or only those most obviously in need of cleaning; or, especially if you are treating large numbers of only moderately valuable books, you may decide to be satisfied with the modest cleaning action of the potassium lactate solution itself. (This has been the course taken by the pilot project at Olin.)

Timing the salting and oiling applications - The Library of Congress recommends oiling within one to four hours after salting, to minimize hardening of the leather (which is sometimes caused by the water in the salt solution). Hardening has not been a major problem

in our experience, and such precise timing may not always be possible; but it should be kept in mind.

Batching

It's usually best to batch the work--i. e. to carry all the books in one batch through all the steps in the treatment process before beginning a second batch. Especially if a number of people are working on the project, overlapping batches increases the risk of confusion, with some books getting treated twice or not treated at all. In a one-person project, however, it might be more efficient to let the batches overlap somewhat, for example selecting and dusting the books in batch #2 during the drying time after the oiling of batch #1.

Dividing the work between student assistants and a supervisor

The division of work on a leather project between students and a supervisor can easily take advantage of the differing levels of experience and continuity required by the various steps of the treatment. The actual application of the salt solution and the oil can be done by people with training but not a great deal of experience; and can be done by five or six different people for each batch, each one working for an hour or so. These steps can easily be the collective responsibility of a group of student assistants working at various times. On the other hand the selection of books to be treated (and identification of those that need mending, special care in treatment, or consideration for transfer to Rare) requires somewhat more expertise and experience. Both book selection and the checking of the work after treatment are best done by the same person for every batch, someone who can spot persistent difficulties and provide consistent feedback for the people doing the salting and oiling; and both these steps, the first and last, need to be done at reliably scheduled intervals, since the flow of the rest of the work depends on them. Thus these things lend themselves to being done by a supervisor, or perhaps by one particularly experienced and devoted student assistant especially scheduled for the work.

Scheduling student assistants for work on preservation projects

Every library must find its own way of assimilating preservation work into its regular work routines, based on that library's work rhythm and staffing patterns. The experience of the leather preservation project in the Circulation Department at Olin Library is offered here simply as a basis for experimentation and variation by other libraries.

The major factor which has determined the timing of leather preservation work at Olin has been the semester loan. Since most of the

books loaned through the department are on either a semester loan or a six-month loan (for faculty), and a large proportion of these are returned in the latter part of the semester, the discharging work load is considerably heavier then. However, students must be hired, trained and scheduled at the beginning of the semester when there is considerably less for them to do. The leather preservation project was designed to take advantage of this unused student time at the beginning of the semester.

In the first two semesters of the project about seven book dischargers were trained for preservation work. Whenever one of these students was scheduled for discharging s/he would consult with the supervisor in charge to determine whether s/he could be spared for preservation work. The project was suspended completely about two-thirds of the way through the semester when dischargers could no longer be spared.

For the third semester a more structured system was adopted which proved considerably more effective. First, the evening hours were chosen as those most likely to offer marginal time--i.e. that time in which dischargers have to be scheduled but in which the work is often light enough that they can be spared. The hours identified were from 5-12 Sunday through Thursday and 5-10 Friday and Saturday. For these hours one of the two or three discharging positions on the schedule was marked in a special color and designated as "book preservation/discharging." When students signed up for their hours for the semester they were told that this position was reserved for those who had been trained for preservation work or wished to be trained. Students were discouraged from signing up for fewer than three preservation hours, to make the most efficient use of training time and to keep the project from becoming too diffuse.

For the first part of the semester, the student who had signed up for the preservation position for each hour worked on preservation projects exclusively--unless s/he was absolutely needed for other discharging tasks which couldn't be done by someone else or postponed. In cases of unusually heavy work or student absences the supervisor "borrowed" the preservation student for as long as necessary. Everyone assumed that these interruptions would be more frequent as the semester progressed; and, as in previous semesters, the project was suspended completely when the regular work of the department became heavy enough that individual batches were taking substantially longer to finish. (We didn't want books missing from the stacks more than four or five days at most.)

Using this system of scheduling work we were able to make much steadier progress. Some requirements other than those already mentioned or implied:

1. The students must be extremely carefully trained and highly motivated, since they work much of the time without direct supervision.
2. All the evening supervisors should be somewhat familiar with the project; and it helps a great deal if the preservation supervisor, or whoever has primary responsibility for the project, can have a schedule flexible enough to allow some evening hours, in order to be there occasionally when the students are working.

Obviously other libraries will have different work rhythms, different needs and possibilities. This is an example, however, of one way preservation work can fit into the routine work of a department.

Using a log book

A log book is especially important if a number of people are involved in the project. In any case you should keep track of basic information about the work. The information can be recorded by batch, beginning with the call number span, location, and number of books, followed by a record of who works on that particular batch, what they do, and for how long. (See sample entries in the section on salting in Part III, p. 35.) The work notes tell you which students are actually having and taking the opportunity to work on the project, as well as how much work each batch takes.

Other things that can be recorded in the log book:

1. numbers of books mended or sent to be rebound.
2. the number of books in each call number span which don't yet need rebinding but are already too badly deteriorated to be treated. This will give you a rough idea of the proportions of this problem in your collection.

Notes between the students and supervisor about changes in the treatment, special problems with particular batches, etc., can be put in a separate section of the notebook or in a separate notebook altogether. Students should be trained to check for messages before doing anything else each time they work on the project.

Estimating the probable output of a project

In the pilot project at Olin an average batch of 90 books needs approximately 7-8 hours salting and oiling time (that's just application time, not drying time), and about 2 hours selection and inspection time. (Dusting and reshelving haven't been counted.) At full speed we've

done three batches per week adding up to:

250-300 books

6-7 hours supervisory time (spent directly with the books, not counting supervision of student workers, training, evaluation, etc.)

20-25 hours trained student time spent salting and oiling.³

³ The estimates of the Library of Congress are much more conservative; they currently estimate about 50 books in 7-8 hours for either potassium lactate or oiling. It should be noted that our estimates for salting and oiling time are based on several factors:

- a. The books to be treated are pre-selected; i. e. the person applying the salt solution or oil doesn't have to worry about which books to treat, only how to treat each book.
- b. Much of what we have treated has been large sets of volumes bound similarly if not identically; this hastens the work considerably, since once the worker has determined the appropriate amount of salt or oil to apply and gotten into the "rhythm" of the binding style of that set, successive volumes can be done fairly quickly.
- c. Under our system, no one person is likely to work at the project for more than 3 hours at a stretch; most stints are for only 1 or 2 hours. In effect, we always have "fresh horses." The 7 hours of salting and oiling work are rarely continuous, but more likely stretched out over a couple of days.
- d. Partly because the work on the leather preservation project is somewhat of a treat, i. e. an alternative to the more routine discharging tasks, the motivation and efficiency of the students involved in the project have been quite high, without any apparent sacrifice of accuracy or care.

TRAINING STUDENT ASSISTANTS

Note: If you are reading this manual straight through (and are not yet familiar with the treatment procedures) some of this section may be unclear. The procedures mentioned here are all described in more detail in Part III.

Recruitment

There are two possibilities here: selecting students who seem especially suited to the work and have convenient hours; or putting up posters asking for volunteers--making sure that those students you would have personally selected are aware of the possibility. Soliciting volunteers has the advantage that anyone becoming involved wanted to, which is likely to mean greater care and better work.

Initial training session

You can do the initial training session for a number of students at a time. You may want to open these sessions to anyone who is interested, whether or not they are likely to become directly involved, so that the staff in general has a chance to observe and learn about the procedures.

Things that should be covered:

1. Background.
 - a. The nature and function of the treatment.
 - b. How the project fits into general preservation efforts in the library; how student work fits into the project.
2. A tour of the work space and materials.
3. Demonstration of techniques for salting and oiling. First demonstrate wet hand/dry hand technique, emphasizing how crucial this is. Then demonstrate salting and oiling. Emphasize the importance of staying back 1/8" from any edge where the leather meets paper or cloth, and using special care not to drip salt solution or oil onto the pages when doing the top and bottom and side edges. Show plenty of samples of different styles of binding, especially types that require different amounts of oil. Be sure to show some of the things that should not be treated. (Theoretically the supervisor should catch all of these, but it's good to have students watching for the occasional stray that sneaks by.)
4. Recording and communication. Show how to record the work in the log book and in notes on the shelves. Emphasize the need for feedback in all directions.

5. Scheduling. At the end of the session, have each person who is likely to become directly involved write down his/her hours on a 3x5 card. (These should be just the hours in which the student is able to do preservation work.)

A master schedule, showing which students have preserving hours at which times, will facilitate planning.

Schedule some time to work with each student individually.

Individual sessions

Each student needs a minimum of an hour's individually supervised time past the initial training session, before he or she is ready to work independently.

The student can review the salting and oiling procedures just before doing them by reading those sections of the manual. The summary sheets in the Appendix may also be helpful.

Check for:

- wet hand/dry hand technique;
- 1/8" back from edges that meet paper or cloth;
- care in doing top and bottom and side edges, to avoid dripping on pages;
- amounts of salt solution and oil applied to sponge and then to books.

This is also a good opportunity for talking with individual students, getting some sense of their personal interests, background in related work (if any), related future plans (if any), favorite composers, etc.

Using this manual

Reading the manual cannot take the place of personally conveyed information and physical demonstrations. Many of the possible mistakes--oily fingerprints on cloth, salt stains on the pages--will last as long as the book lasts; and others--insufficient applications of either chemical--will negate the entire treatment. But also, sharing enthusiasm for the bindings you have to work with is itself an important part of the training. The sections on salting and oiling, or adaptations of them, should be available for reference at all times.

Student questionnaire

After the first several months of work on the pilot project an informal questionnaire was distributed to the students who had been actively involved, asking them to evaluate the general organization of the project, their training, and their feelings about the work. Four of the five students who had been putting most of the time into the project

replied very carefully and thoroughly; and their responses provided a number of ideas for adjustments to the procedures and things to emphasize in training. This might be a good idea for anyone starting up a similar project.

A final note about craftsmanship

Doing the leather treatment properly requires not only technical training but also care, experience, and cultivated judgment. It can only enhance the quality of the work if you encourage a sense of craftsmanship and an interest in styles of binding, binding materials, all the evidence of imagination and exuberance and devotion that leather bindings offer--and this is valuable not only to the quality of the work but also for everyone's shared joy in doing the work. That exuberance expressed in the bindings can be contagious, and might as well be.

BASIC PROCEDURES

Note: This section contains some references to techniques and elements of organization that are necessary to a large project but may be unnecessary in a smaller project. We felt that the value of these details to someone planning and conducting a large project would counterbalance any distraction they might represent to someone concerned with a smaller project.

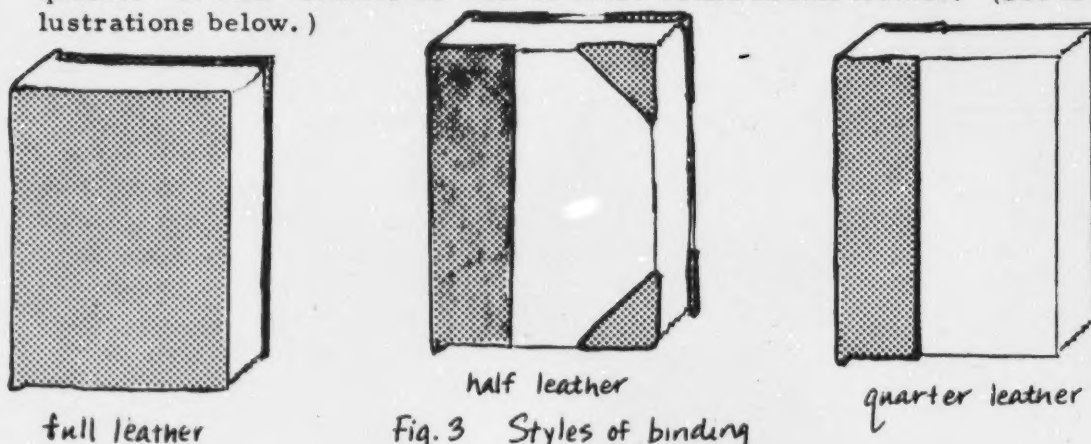
The sections on dusting, salting and oiling are designed to be usable separately as instructions to students. In addition, one page summaries of the main points of these techniques are provided in the Appendix.

SELECTING BOOKS TO BE TREATED

The job of selecting from some particular area of the stacks the leather-bound books to be treated must be done by someone sufficiently experienced to catch certain exceptions and special cases (explained below). If possible this job should be done consistently by one person.

Styles of binding

The term "leather-bound books" refers to those which are bound in quarter- or half- leather as well as those bound in full leather. (See illustrations below.)



All of these should be treated (with the exceptions described below.).

Bindings which should not be treated

1. Particular types of leather.

Vellum--A vellum binding is stretched onto the cover in a drying process, and can be ruined by the addition of moisture. To spot vellum: it's white or off-white, very tough, similar to parchment.

Alum-tawed leathers-- These have different chemical needs from leathers which have been tanned. Pigskin is the most common alum-tawed leather. It is usually unstained, with distinct holes in the surface left by the bristles, and a triangular-patterned grain.

Suede-- Suede has a soft powdery napped surface rather than a smooth surface.

2. Fake leathers.

Cloth made to look like leather will give itself away at the edges-- the weave shows where it's worn.

Paper can be textured and printed to look very much like leather on

casual inspection, and was used a great deal on late nineteenth-century and early twentieth-century books, in subject areas which also have many genuine leather-bound books. Paper almost never feels like leather. (Note: Sometimes a half- or quarter- leather book has a leather-textured paper on the rest of the cover, possibly in a matching color. You should call this to the attention of the salters and oilers with a note inside the book.)

Vinyl can also be difficult to spot. It usually feels different from leather, and looks different edge-on, if you can see where the corners have been turned in.

3. Coated leathers.

Especially in a small private collection, or books in a larger library which were donated from a private collection, one must be alert for bindings which have been varnished or lacquered or otherwise coated with an impermeable material. At one time such coating was thought to be beneficial for leather bindings and was often done to improve their shine on the shelf. Usually the varnish or lacquer is obvious, especially on older books where it is cracked or peeling or has dulled. These coated bindings should not be treated. If they are, salt or oil will be absorbed only through cracks in the coating which will darken the leather selectively at those points, and may seep in at those points in heavy enough concentrations to migrate into the text block. (All of these dangers are greater with oiling than with salting.) Occasionally the coating on a binding is not obvious and the binding may find its way into the batch to be treated. The section on salting includes instructions for what should be done if this happens.

4. Badly deteriorated leather.

You should not treat any leather which is already so badly affected by "red rot" that the leather has been reduced to a powdery dust or is severely cracked or flaking. The salt solution can't reverse the deterioration, and the moisture may in fact do harm by gelatinizing the leather. Theoretically oil could help by lubricating what's left, but in many cases the leather that remains has too little substance to hold the oil, so that any that is applied will soak through to the boards, or even the textblock. Better to use your time and energy on less risky prospects.

By far the best way to identify types of leather and leather imitations is to be shown specimens by someone who has experience recognizing them. Even after a thorough indoctrination you will probably need to consult with someone about particularly tricky cases.

Rare books

If you are working in the general collections you may occasionally find books which should be in Rare Books or History of Science or some other form of limited circulation. Cornell's official cut-off date for Rare Books is 1800, but in practice the Rare Books Department is unable to process or contain all pre-1800 imprints. Watch for things which are

especially old; or in addition to being old are especially vulnerable to theft due to numerous or unusually attractive prints, autographs by the author or original owner, other special features.

Anything that you suspect might be a candidate for Rare Books should be brought to the attention of the Rare Book Librarian before it is treated or repaired in any way.

Mending problems

All mending problems should be identified as the books are removed from the stacks. Simple repairs which do not require full rebinding can be handled by someone working with the leather preservation project or by whoever does simple repairs in your library. (In any case repairs should always be done by someone who knows what they're doing.) You may want to go further to avoid rebinding, i. e. to solve the problem with a repair, than you would for a non-leather book; this is a matter of judgment.

In Cleaning and Preserving Bindings and Related Materials, Carolyn Horton recommends that external repairs which can be performed without opening the book be completed prior to the leather treatment; whereas internal repairs (tipping in pages, for example) should be done after treatment, so that the binding has been lubricated before being stressed in the course of the repair.

Care in handling books

There's always a danger--especially with old and fragile books--that the handling required in the course of the treatment process will do as much harm to a binding as the treatment itself does good. Some suggestions for careful handling:

Remove individual books from the shelf by pushing back the ones on each side, so that you can grasp the book by the middle of the spine instead of the top where it's so much weaker. Be sure that the books left on the shelf are pushed together and supported, with a bookend if necessary.

Similarly, be sure all the books on the book truck are secure, using bookends if necessary, to avoid dropping them off the truck. This is especially true if you are going to be entering and exiting elevators--the grease pit is usually a long way down and not particularly beneficial.

Recording

The number of books in the batch and the span of call numbers from which they were taken should be recorded in the log book. There is no need to record individual call numbers, since the treatment will be noted in each book.

Notes to other workers

If the filled book-truck is to be left waiting for other workers in the work area, it should be labeled to distinguish it from other anonymous book trucks that come floating through. Make two labels, one that says "Ready to be dusted" and another "Ready to be salted, " and place them on top of each other on the top of the truck. These labels can be permanent ones on heavy card to be reused for each batch. The person who does the dusting should remove the dusting sign.

Books currently circulating

In a small library or special collection you might want to devise a way of catching the books which are absent from their place on the shelf when you go by. In a large collection this is probably not worth the trouble, especially if the proportion of books circulating at any one time is low. The energy spent chasing down those last few books in each batch could more profitably be spent treating another hundred.

One exception to this: in the case of a set which is all leather-bound, from which volumes are absent, it's probably worthwhile to pull the cards from the file and make notes requesting that they be sent to the preservation project when discharged.

DUSTING

Use cheesecloth, or, if one is available, a vacuum cleaner specially equipped with a dusting tool.

Hold each book so that the dust can be dusted off towards the floor. (See figure below.) Keep a firm grip, to keep the pages closed tightly, but work gently; any dust that works down between the pages will have an effect similar to sandpaper over the course of years, grinding away at the paper.

Be careful removing the books from the truck, also--don't grab them by the tops of the spines; lift them by the middles. (See Fig. 5, below.)

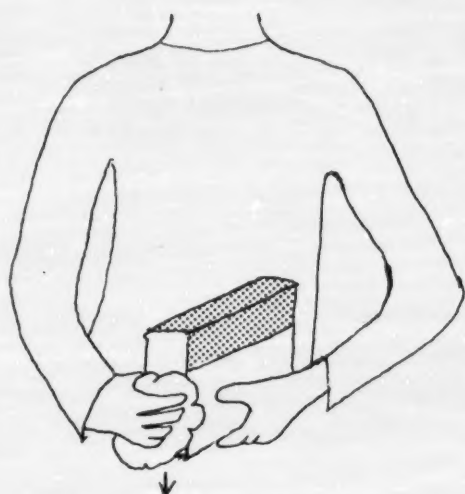


Fig. 4 Holding book
while dusting

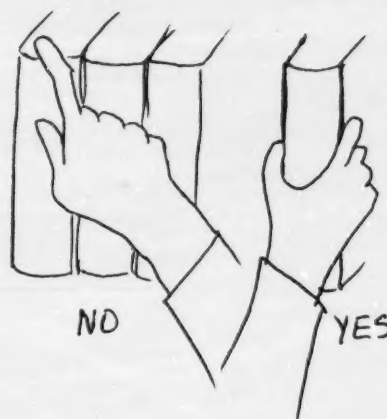


Fig. 5 Removing books from
the book truck or
shelf

SALTING

Books ready to be salted will be found in the preservation area on a book truck. They should be in call number order on the truck and you should try to work through them in call number order.

Getting ready to work

Spread out clean newsprint to work on.

Get the salt solution, a sponge, and a glove from the supply locker. You should ALWAYS wear a glove on the wet hand when salting!

Prepare the sponge:

Dampen it in water, being careful to wring out any excess that could dilute the salt solution.

Apply some salt solution from the bottle onto the sponge; or pour about a tablespoonful of salt solution into a small saucer and dip the sponge into that. (This way the dirt and stain which the sponge picks up from the books won't "pollute" the solution in the bottle.)

Squeeze the solution into the sponge so you'll get an even application on the books.

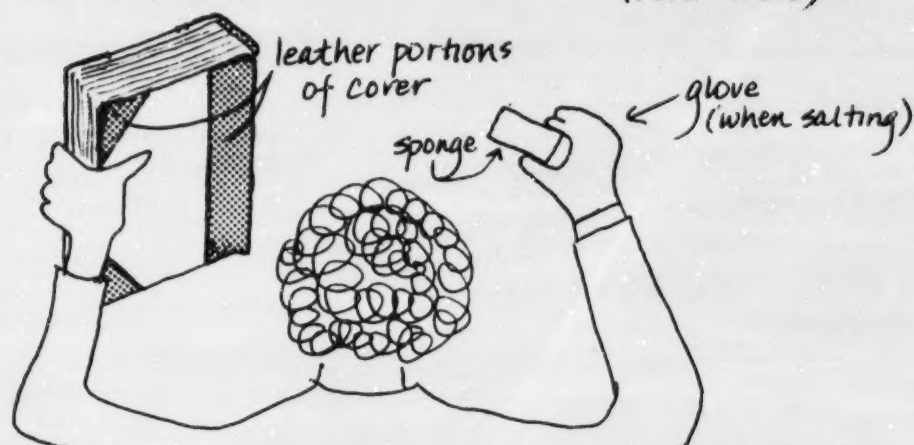
Make sure that you have some on at least one corner for doing edges.

You will need to apply more salt solution to the sponge at regular intervals (every two to four books) to ensure an adequate coat on every book.

Wet hand/dry hand technique

Whenever you are either salting or oiling you must be careful to get only one hand wet and keep the other one clean and dry. If you're right-handed it works out as shown in the figure on the following page:

Fig. 6 Right-handed leather preservationist at work
(rear view)



Your left hand (DRY) holds the book on the opening edge, touching only the non-leather portion of the cover that won't be treated, thereby remaining dry for handling the dry portion of each successive book; and thereby avoiding wet or oily fingerprints on non-leather portions of any of the books.

Meanwhile your right hand (WET) holds the sponge and applies the salt or oil and can lift or hold the book by the spine (which is/will be wet and won't be hurt by being touched with a wet hand).

If you are left-handed your hands will reverse roles. (Dry right, wet left.)

You are most likely to err when picking up a second book from the truck. Your natural inclination is to use your usual lifting hand (i. e. right if you are right-handed)--but that's the one that is wet and disqualified. Keeping the sponge in the wet hand will remind you that it is wet.

For books bound in full-leather, hold the book as you normally would, and apply the salt over all the cover except the portion under your fingers. Put the book on the drying shelf and then touch up the part that you missed. (Special directions for oiling full-leather books are included in the section on oiling, p. 36.)

Books which are heavy or very large and awkward may be difficult to hold in one hand as you work. Balance the book on a sheet of newsprint, being careful to avoid putting one book down on the stains left by another, and replacing the sheet after every few books.

Staying back from edges that meet cloth or paper

When a half-leather or quarter-leather book is bound the paper or cloth is put on the cover slightly overlapping the leather. If salt or oil is applied to the leather all the way to the edge of the paper, it will seep through the overlapped leather and stain the paper above it. In order to avoid this you must stay back from the edge of the leather wherever it meets paper or cloth, leaving a margin of $1/8$ - $1/4$ inch. (Since the salt solution evaporates fairly quickly, less margin is necessary when salting.) The margin you leave should be as neat and even as possible.

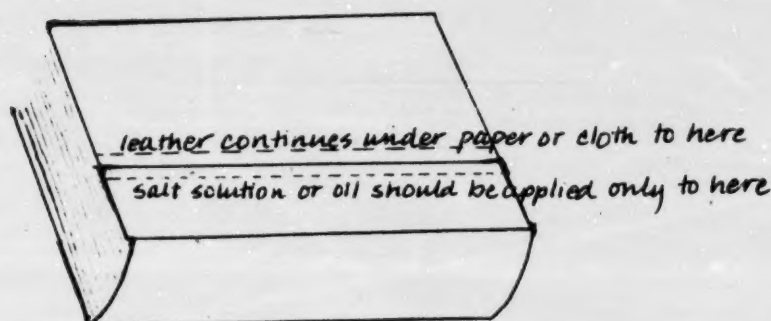


Fig. 7 Staying back from edges that meet cloth or paper

Areas which require special care

Do the places where the leather is turned over the edges of the boards (at the top and bottom and sides, marked with heavy lines in Fig. 8, p. 32) with just a corner of the sponge, working very carefully to avoid dripping

or wiping across the block of the pages or the decorative stitching at the top of the spine (the headband). If you hold your fingers close to the corner of the sponge you can control it more easily.

Don't try to do any of the leather that's turned over onto the inside surface of the covers.

Knowing where you are

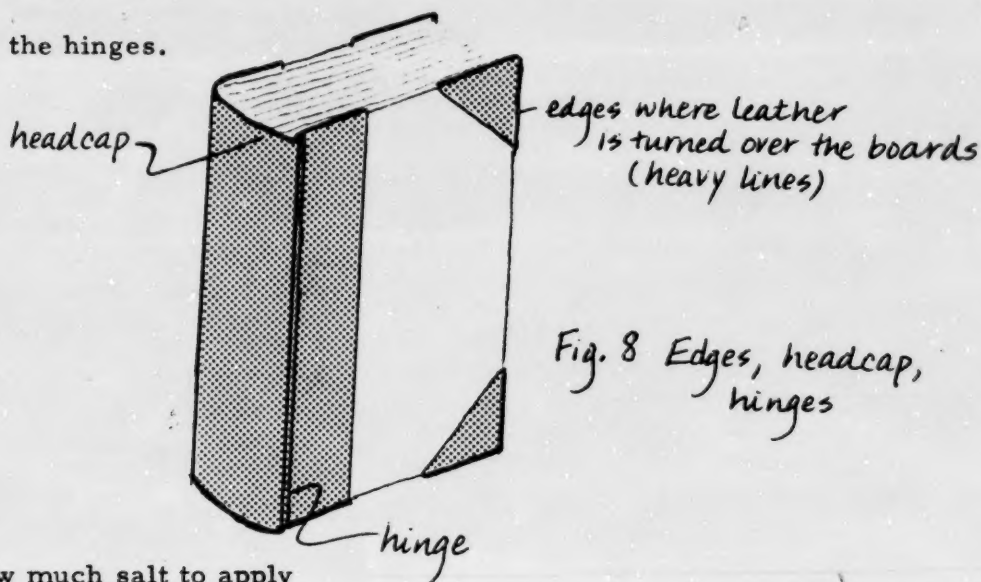
You should work out a system for knowing where you are at any particular moment. You can do every book in a particular order: spine, then corners, then edges, for example; or do the surface and then the edges of each section of leather by turn (this requires changing your grip on the sponge more frequently if you're going to be sufficiently careful with the edges); or just have an excellent memory for space relations.

Be particularly careful to remember and coat well

the edges

the spine, especially the top of the spine (headcap) (but avoiding the headband)

the hinges.



How much salt to apply

This is an uncertain point. According to the leather preservation specialists at the Library of Congress, nobody appears to know how much potassium lactate is enough.

If you put on too much it can dry to a white powder that is difficult (although not impossible) to remove. On the other hand, you're not doing much good if you're just dampening the leather with the little bit of water in the sponge.

The best practical guideline is that the salt solution should show wet on the leather as you move over it, but not as a puddle. Darkening of the leather is not in itself any indication that you're putting on enough solution (or too much either, for that matter) since some leathers, especially light-colored calfskin, darken readily when exposed to even a very small amount of moisture.

Many people, when first learning to apply the salt solution, make overlapping quick small strokes, possibly to reassure themselves that they're being careful. It is important to go slowly enough to aim properly, particularly near edges, but one long steady stroke the length of the surface to be covered will usually give an adequate application, and a smoother one than you can get dabbing it on.

Special problems

Worn leather. Don't apply either salt solution or oil to any portion of the cover on which the leather has been substantially or completely worn away.

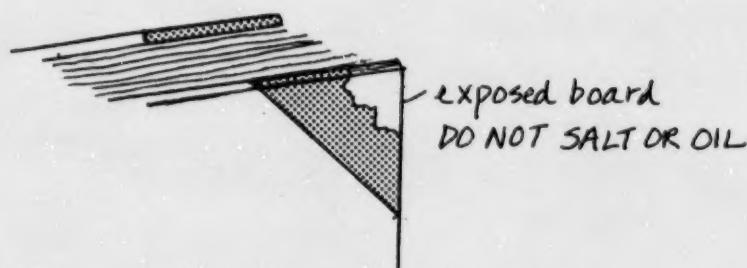


*Fig. 9 Avoiding patches where leather
is thin or worn away*

Darkening of the leather when salt solution is applied. This is to be expected, especially with light-colored leathers such as calfskin. It's usually a temporary reaction.

Stains which bleed into the sponge. This is quite common with leathers stained a dark red or blue. You need to worry about this when you are about to treat a light-colored leather after you've done a number of dark-colored leathers. Check the sponge; if it's full of stain, wash it out before doing the light-colored leather, since the stain could conceivably transfer onto the leather.

Mending problems. Some mending problems are more noticeable when the book is handled for treatment than when it's first taken from the shelf. Any mending problems you notice should be brought to the attention of the Preservation Supervisor.

Salt solution not penetrating. Carolyn Horton, in Cleaning and Preserving

Bindings and Related Materials, observes that the salt solution may not penetrate leather which has been coated with wax or varnish; instead the solution will stand up in beads on the surface. Ideally these coated leather bindings should not be selected for treatment, but if one is, inadvertently, and beads of solution form on the surface, they should be wiped off with a piece of clean cheesecloth, since the leather may become spotted if they are allowed to dry. The book should be left with a note on the supervisor's desk or shelf, to make sure it isn't oiled.

The drying set-up

When you've finished applying the salt solution continue to hold the book in your dry hand and set it on the shelf to dry. If the book is heavy or awkward you can use your wet hand on the spine to steady it as you put it down, taking care not to put wet fingers on dry parts of the book, and smoothing out any fingerprints left by your wet hand (on the leather) with the sponge after you put the book down.

The drying shelves are filled with a row of book-ends to make slots, each slot intended to hold one book. You should fill the slots in the order in which books would be shelved, left to right and top to bottom. There are special shelves for oversized books at the bottom right.

The book is placed on the shelf according to a code to indicate what's happened to it:

salted--spine to the wall

oiled--spine facing out

This way anyone can tell at a glance what remains to be done.

Cleaning-up

Rinse out the sponge thoroughly, removing all the book dust and leftover salt solution. Water should run clear from the sponge. Remember to wash the sponge before you remove your glove! If the glove is to be re-used, wash it carefully and set it to dry; if the glove is disposable, throw it away.

Record-keeping

Make a sign that shows your name, what you did, and the day and time you finished working (to help fellow workers keep track of drying times.) See Fig. 10 on the following page.

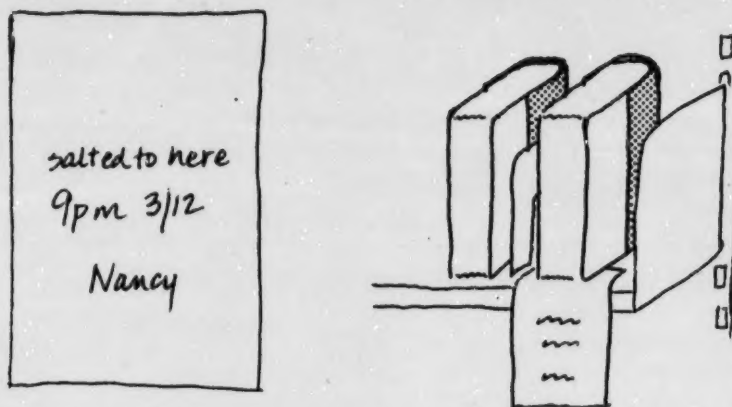


Fig. 10 Note on drying shelves

In the logbook, enter the date, the span of time you worked, what you did, for which shelves (by number, according to the numbers on the shelves) and your name. See sample entries below.

Batch 37 DC1A18 - DC 33.2 557

102 taken
127 not taken

3/9 10-11 dusted whole batch

Nancy

2/9 11-12 salted 1, 2, 3

George

2/10 5-7 salted 4-9

Andrew

2/10 7-9 salted 10 rld 1-4

Janik

2/10 9-11 oiled 5-9

Kathy

2/10 11-12 oiled 10

Shelid

Fig. 11 Sample entry from log book

OILING

Books ready to be oiled will be on the drying shelves, with their spines turned to the wall, and with notes saying that they've been salted. Before you begin oiling check to make sure that there has been adequate drying time for the salt solution (usually about an hour).

If possible you should oil books within one to four hours after salting, to minimize hardening of the leather (which can be caused by the water in the salt solution). Whether you can time the applications this way depends largely on the hours you are scheduled to work and whether someone is scheduled after you. (If you are working for several hours, for example, you can salt for an hour, then go back and start oiling the same books. Each book will have dried for an hour and yet be oiled soon after salting.) Try to keep this in mind as a guideline and pace your work accordingly; but don't worry if it's not possible.

Start at the upper left corner of the drying shelves, working through in the same order as the books were put on the shelves. See the paragraphs in the section on salting (pp. 29-32) concerning

Getting ready to work

Wet hand/dry hand technique

Staying back from edges that meet cloth or paper

Areas which require special care

Knowing where you are.

Some additions to these instructions:

Filling the sponge-- The sponge should be filled with oil, although not dripping, and may need to be refilled more frequently than when salting.

Books in full-leather--Hold the book by the spine (rather than the side on which the book opens). Oil first the outer edges of both covers and the top and bottom edges, avoiding the side near your fingers (see Fig. 12a, next page) then set the book down on the drying shelf extending out over the shelf somewhat so that you can do the spine and the remaining areas of the sides (Fig. 12b); when you're all done carefully push the book in the shelf touching it as lightly and as little as possible.

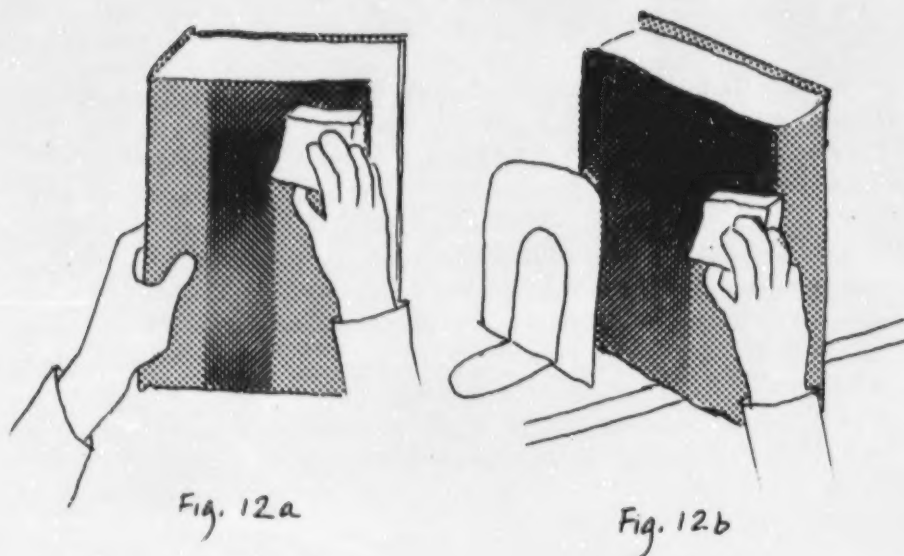


Fig. 12a

Fig. 12b

Oiling a book bound in full leather

All this delicate maneuvering is for the sake of two points:

1. even your wet hand on the wet leather can make fingerprints (see below).
2. many leathers, especially calf skin, will stain if not oiled in one continuous stroke, so it doesn't work very well to leave just the small patch around your hand dry and touch up that one patch.

Finishing touches--After applying oil to all the leather portions of the cover, go back and do last strokes on the spine and the hinges. These areas are especially exposed to the air when the book is on the shelf, and are subjected to the most stress when the book is used.

Darkening of the leather when oil is applied--Most leathers fade when they have dried out, and the addition of oil often brings out the original color more vividly. Slightly different colors used in the same set, which look the same when dried out, may "bloom" into different colors again when oiled; or parts of the same volume which have dried to different degrees and different colors may look even more different after being oiled. None of this is cause for concern, although it's often interesting to watch.

One aspect of darkening leather may be cause for concern. Leathers which are unusually absorbent may show darker fingerprints where they have been touched with your "wet" hand. This is most likely to happen when you place the book on the drying shelf, holding it by the spine with your wet hand. There are several ways of minimizing this:

1. Don't let your wet hand get sopping wet.
2. Hold the book as lightly as possible (consistent with safe handling).
3. In some cases you may be able to even out the oil on the place where you were touching it, using the sponge, after the book has been placed on the drying shelf.

How much oil to apply

The oiling treatment is intended to lubricate the fibers of the leather throughout its thickness, rather than simply polishing the surface; thus you want to apply enough oil to penetrate. If too much oil is applied, however, it may soak beyond the leather into the boards and possibly even the paper.

To complicate things further, different bindings will absorb the oil in different ways, depending on characteristics of the original skin, the way it was finished, and its present condition.

These are some suggestions for approaching each individual book.

1. Analyzing the leather. It helps to imagine the leather of each binding in cross-section, and imagine the oil being absorbed into the leather.

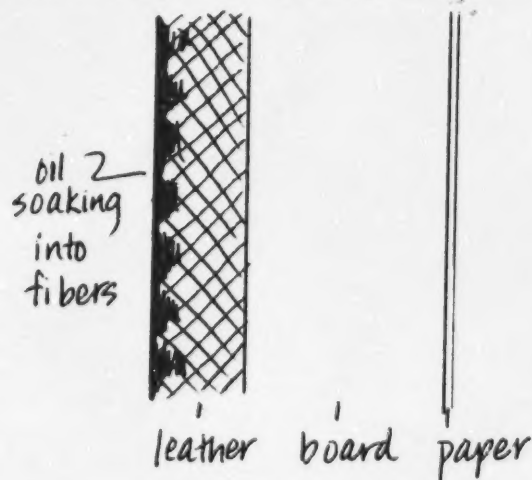


Fig. 13 Schematic diagram of leather binding in cross-section

Some things to consider:

thickness-- Generally speaking, the thicker the leather is the more material there is to absorb the oil.

porosity and polish--Some leathers have very porous surfaces with minimal surface resistance to the oil. Others are so highly polished that the oil sits on the surface and sinks in very slowly. (At the extreme of this category are those leathers which have been laquered, varnished or in any way coated, which will absorb oil only where the coating is cracked, and should not be treated at all.)

age and condition--The more the natural oils have dried out of the leather, the thirstier it will be for the added oil from the treatment. If the leather is severely dried out, however, or if it has been affected by acid, the fibres may have lost their ability to hold the oil. Thus a binding that seems to be drinking up the oil especially gratefully may in fact be passing it along generously to the rest of the book.

2. Translating this into an appropriate treatment. Any leather which is unusually thin or unusually dry should be given a light coat. A binding which has been seriously affected by acid damage should not be treated at all.

For all others, start with a moderate coat. The oil should show on the surface as you apply it. (Remember that you are applying oil for the full thickness of the leather, not just the surface.) Usually you can see that the oil is making a difference to the surface right away.

If the oil soaks in quickly and the leather is thick and in relatively good condition, you can apply a slightly heavier than normal coat. But beware of the "wick effect" described above, in which the oil is simply passing through the leather into the rest of the cover or book.

If the leather looks the same after five minutes as it did before you applied the oil, if it is only normal thickness, and if you know that you applied an adequate coat, don't add more. You would probably just be oiling the boards underneath.

If the leather seems slow to absorb the oil, the binding may need extra drying time, but it doesn't need more oil. It is not necessary to rub the oil in.

Any leather which is extremely resistant to either the salt or the oil has probably been coated, and should not be treated at all. Rub off any oil you have applied, and leave the book with a note for the preservation supervisor.

The oiling treatment often improves the appearance of a binding dramatically, but not always. It's important to remember that the point of the treatment is lubrication rather than polish.

Judging how much oil to apply requires imagination and careful attention;

at first you must be very conscious of your judgments. Eventually they will be more intuitive, and you will chart a confident course between the legendary Scylla and Charybdis of book preservation, the Ineffective Insufficiency and the Messy Excess.

Caution with details

Avoid any vigorous rubbing over:

gold tooling (it can lift or dull)

leather labels or inlays (they can loosen).

These areas may be oiled, but gently.

Avoid altogether:

paper labels

severely worn patches of leather.

And be careful not to allow any oil to touch:

tying strings attached to the book (especially fabric)

the decorative threads at the top of the sewing on the spine.

See the paragraphs on Clean-up and Recording in the section on salting, pp. 34-35.

One last note: If in the course of oiling a book you notice a white powdery or flakey residue, indicating that too much salt solution was applied, or anything else suggesting a problem with the salting, please leave a note in the book and place it on the preservation supervisor's shelf. Include in the note the number of the shelf from which the book was taken. You should not feel that you are in effect "telling on" the person who did the work. Adequate feedback for all the participants in a preservation project is crucial to success.

PREPARING A BATCH FOR RESHELVING

This last step should be done by the same person for every batch, if possible, to provide consistent feedback for the people who do the salting and oiling.

Checking absorption of the oil and rubbing books dry

Allow at least 24 hours drying time. Overnight may be sufficient for some batches, depending on the absorptiveness of the various leathers in the batch. Be careful--there is likely to be considerable variation within one batch. Check the times on the notes, and check that the books all feel dry to the touch.

At the end of the drying time all the books should be rubbed dry with a clean piece of cheesecloth. You can do this before you begin to remove the batch from the shelves. Using wet hand/dry hand technique to avoid oily fingerprints on cloth or paper, dry each book and set it back in order on the shelf. Or you can remove the books to a book truck, rubbing them down and checking the work, and go through them again to record the work.

Checking the work

Look for fingerprints, oil stains at the borders where leather meets cloth or paper, too large a margin unoled at the borders, any signs that the work wasn't done thoroughly. If you find any indications that someone needs more follow-up training, make a note of who worked on that section.

Check also for mending problems that may have been missed before, as well as those which were purposely treated before mending.

Recording the treatment in the book

This is done for several reasons:

1. The oil should be reapplied at regular intervals, and under certain conditions the salt may need to be reapplied also. (See comments in the introduction pp. 8, 9 and 10.) The frequency of treatment depends on environmental conditions and use; but obviously it's important to be able to know how long it has been since a book was last treated.
2. It's a good idea to have a record of exactly which books have been treated; and this is most easily done in the books themselves.

Open each book to the last sheet and write in pencil at the bottom right corner Pl & O (for potassium lactate and oil) with the month and year. See Fig. 14, below.

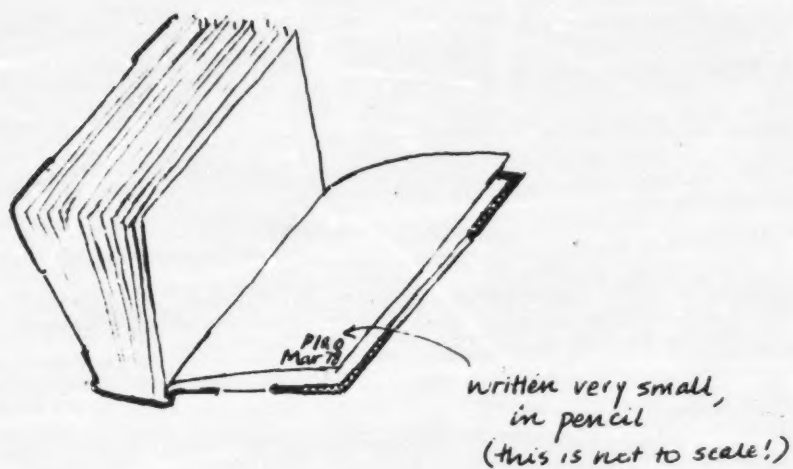


Fig. 14 Noting the treatment
in the book

APPENDIX: Summary sheets for dusting,
salting, and oiling

DUSTING

1. Remove books from truck and dust one at a time.

2. Dust towards floor }

Hold book firmly

Work gently

to avoid getting dust between pages.

SALTING

1. WEAR A GLOVE!
2. Remove books from truck in call number order.
3. Touch dry parts of the book with your dry hand;
wet parts (or those parts about to be wetted) with your wet hand.
4. Stay back 1/8" from edges that meet cloth or paper.
5. Be especially careful with top and bottom edges:
 - a. don't forget them.
 - b. use just a corner of the sponge.
 - c. don't slop on the pages of the book!
6. Salt should show wet on the leather as you move over it, usually evaporates quickly. Don't worry about darkening of the leather.
7. If you are about to do a light-colored leather and the sponge is very dirty with stain and dust, wash the sponge.
8. Put mending problems on the bottom left shelf.
9. Put books to dry with spines toward wall. (Oversize--bottom right shelves.)
10. Don't forget (when you finish)
 - clean up
 - note on shelf (name, date, time, salting or oiling)
 - entry in notebook (date, name, salting or oiling, shelf numbers, time span).

OILING

1. Wet hand/dry hand (as in salting).
2. Stay back 1/4" from edges that meet cloth and paper.
3. Be especially careful with top and bottom edges.
4. Think about how much; visualize the leather cross-section; watch as it goes on.
5. Mending problems on bottom left shelf.
6. Put books to dry with spines toward you.
7. Don't forget
 clean up
 notes on shelf
 entry in notebook.

Selected Bibliography

Banks, Paul N. "Treating Leather Bookbindings." Chicago: Newberry Library, 1967.

This leaflet explains why leather bindings need preservative treatment, and describes briefly the procedures involved.

Banks, Paul N. "Preservation of Library Materials." In Encyclopedia of Library and Information Science. New York: Marcel Dekker, Inc., 1978. An excellent introduction to the field of preservation. Includes discussions of environmental storage conditions and handling procedures.

Cornell University Libraries Conservation Committee. "Report of the Cornell University Libraries Conservation Committee." Ithaca, 1974. The introduction to this report gives some impressive figures demonstrating "the physical decay of the intellectual resources of major research libraries." Other sections summarize conditions in the Cornell libraries, procedures used at the time of the report, and some proposals for future efforts.

DeWitt, Donald L., and Carol Burlinson. "Leather Bookbindings: Preservation Techniques." History News 32: 8 (August, 1977). Technical leaflet no. 98.

Brief descriptions of basic techniques; very readable section on historical background of leather treatment.

Guldbeck, Per E. "Leather: Its Understanding and Care." History News 24: 4 (April, 1969). Technical leaflet no. 1.

Only brief sections of this report are directly concerned with leather book-bindings, but there are clear simple descriptions of various methods of preserving animal skins, explaining the differences between vellum and leather, for example.

Horton, Carolyn. Cleaning and Preserving Bindings and Related Materials. 2d ed., rev. Chicago: American Library Association, 1969.

A systematic guide to the tasks involved in reconditioning an entire collection. (This should be especially helpful for a small collection with a large proportion of valuable items, in which truly comprehensive reconditioning would be possible.) Includes a section on the treatment of leather bindings. The editorial preface offers some suggestions on deciding what to preserve and on choosing among restoration, replacement, and rebinding for a damaged book.

Middleton, Bernard C. Restoration of Leather Bindings. Chicago: American Library Association, 1972.

Many of the repairs described require relatively sophisticated tools and expertise beyond the reach of most libraries. Reading through them is worthwhile, however, if only for an understanding of what can be done and for the incidental references to various aspects of leather binding construction. Several sections on preservative treatment.

Plenderleith, H. J. The Preservation of Leather Bookbindings. 2d ed., rev. London: British Museum, 1947.

Summarizes research on chemical decay of leather done by the British Leather Manufacturers' Association, and the development by R. Faraday Innes of the preventative treatment described in this manual. (It should be noted that his recommendations differ in some details from the more recent recommendations of other sources noted in this bibliography.) The 1946 edition (which offers a slightly different formula, improved in the 1947 edition cited here) was reprinted by the British Museum in 1970 and is still available.

U. S. Library of Congress. "Preserving Leather Bookbindings."

Library of Congress Preservation Leaflets. Washington: Library of Congress, 1975.

Unusually full discussion of the history of tanning methods and their effect on the need for preservative treatment. Recommendations for storage conditions.

More comprehensive bibliographies on leather preservation and library preservation work in general may be found in Carolyn Horton's book listed above and also in:

Cunha, George Daniel Martin and Dorothy Grant Cunha. Conservation of Library Materials; A Manual and Bibliography on the Care, Repair and Restoration of Library Materials. 2d ed. Metuchen, New Jersey: Scarecrow Press, 1971-72.

Rath, Frederick L., Jr. and Merrilyn Rogers O'Connell, eds. A Bibliography on Historical Organization Practices. Vol. 2: Care and Conservation of Collections, compiled by Rosemary S. Reese. Nashville, Tennessee: American Association for State and Local History, 1977.